

**WHAT IS CLAIMED IS:**

- 1                    1.        An isolated nucleic acid having the sequences depicted in Figure 1,  
2        and defined by the group consisting of SEQ ID NO: 1, SEQ ID NO: 2 and SEQ ID NO: 3.
- 1                    2.        An isolated nucleic acid comprising a nucleotide sequence that  
2        encodes the polypeptide defined by the group consisting of SEQ ID NO: 4, SEQ ID NO: 5,  
3        SEQ ID NO: 6 and SEQ ID NO: 7.
- 1                    3.        An isolated nucleic acid that hybridizes to a nucleic acid as defined  
2        in claim 1 under stringent hybridization conditions.
- 1                    4.        A nucleic acid vector comprising a nucleic acid as defined in claims  
2        1 or 2 operably linked to a transcription regulatory element.
- 1                    5.        A cell comprising a vector as defined in claim 4.
- 1                    6.        A cell as defined in claim 5, wherein said cell is selected from a  
2        group consisting of bacterial, fungal, insect, and mammalian cells.
- 1                    7.        A method for producing a polypeptide, which comprises:  
2                                (i) culturing a cell as defined in claim 5 under conditions  
3        suitable for the expression of DRAP polypeptide; and  
4                                (ii) recovering said polypeptide from said culture.
- 1                    8.        An isolated polypeptide having the amino acid sequence defined by  
2        the group consisting of SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6 and SEQ ID NO: 7.

1                   9.     An antibody that specifically recognizes DRAP polypeptide.

1                   10.    A fragment of DRAP polypeptide or function-conservative variants  
2 of said polypeptide, said fragment or function-conservative variant being characterized in  
3 that, it carries out recombinase/topoisomerase activity associated with the DRAP protein,  
4 and fragment or fragments thereof.

1                   11.    A method for isolating genomic DNA comprising introducing an  
2 oligonucleotide and DRAP into a cell, homologously recombining said oligonucleotide  
3 with genomic DNA homologous to said oligonucleotide and isolating said genomic DNA.

1                   12. A method for targeting mutagenesis of a defined segment of DNA  
2 comprising introducing DRAP and an oligonucleotide homologous to said DNA segment  
3 together with DNA comprising said segment.

1                   13. A method for the removal of a defined segment of DNA comprising  
2 introducing DRAP and an oligonucleotide homologous to said DNA segment together with  
3 DNA comprising said segment.

1                   14. A method for cloning a defined segment of DNA comprising  
2 introducing DRAP and an oligonucleotide homologous to said DNA segment together with  
3 DNA comprising said segment.

1                   15. A method for mapping a defined segment of DNA comprising  
2 introducing DRAP and an oligonucleotide homologous to said DNA segment together with  
3 DNA comprising said segment.

1                   16. A method of promoting gene disruptions of a defined segment of DNA  
2 comprising introducing DRAP and an oligonucleotide homologous to said DNA segment  
3 together with DNA comprising said segment

- 1                   17. A method for the experimental and therapeutic application of DRAP
- 2 driven genetic modification of a gene responsible for a genetic disease comprising
- 3 introducing DRAP and an oligonucleotide homologous to said gene into a cell.